

Development of a Large-Scale CO₂ Sequestration Site in the Illinois Basin

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One of the most important aspects of the development of a large-scale CO₂ sequestration site is reservoir characterization. Because sequestration is most likely to occur under a cap-and-trade or carbon credit scenario, verification of long-term CO₂ sequestration in geologic formations is critical. Consequently, characterization of the injection zone impacts the projections of injection rates and storage capacity at the site. Moreover, this initial geologic characterization creates the baseline in which to compare all models developed from data collected after CO₂ injection begins. Key questions for locating a sequestration ready plant include: what are the seals, how thick is the reservoir, how permeable and porous is the reservoir, what is the reservoir heterogeneity, where will the CO₂ migrate, and what is the ultimate fate of the CO₂. The Mt. Simon Sandstone, a Cambrian age formation, is the most important sequestration target in the Midwestern United States. Because few wells are drilled through the entire Mt. Simon, wells in the Loudon oilfield (Fayette County) and Manlove gas storage field (Champaign County) are used as analogues to model other sites in the Illinois Basin. Using these analog wells and data from Mt. Simon natural gas storage projects suggest that reservoir heterogeneity will be an important factor for evaluating storage capacity and CO₂ plume migration.